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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Drawings

2. Applicant replaced Figure 1 and the previous objection is withdrawn.

Claim Objections

3. Applicant cancelled claim 8, so the previous objection is withdrawn.

Claim Rejections - 35 USC § 103

4. Applicant cancelled original claims 1-9 and presented new claims 10-34. The new claims are rejected under 103(a) over Purdy et al., in view of Miyashita et al.. In the previous office action, Purdy et al. was cited as the primary reference and Miyashita et al. was on record.
5. Claims 10-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purdy et al. (WO 01/00307 A2, Jan. 4, 2001), in view of Miyashita et al. (US Patent No. 6,280,626 B1, Aug. 28, 2001). The patentability analysis first addresses the filtration arrangement (claims 10-19) and the treatment system (claims 27-34) since both sets of claims describe a similar apparatus. The patentability analysis will then address the membrane cleaning method (claims 22-26).

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6. With regards to independent claim 10, Purdy et al. discloses a "membrane module placed in a tank of waste water" and, in Figures 1-3, shows three embodiments of a filtration arrangement. Purdy et al., Abstract. Purdy et al. further teaches a single open-ended tube (housing 2 in Figure 1 and housing 21 in Figure 3) positioned within a feed tank (tank 1 in Figures 1 and 2 that tank 20 in Figure 3) that contains membrane modules (filter modules 3 in Figure 1 and membranes 17 in Figure 2). The Purdy et al. open-ended tube has an upper wall in Figure 3. Within each Purdy et al. open-ended tube there is at least one aeration opening (air diffuser 4 in Figure 1, bubbles shown emanating from air inlet 15 in Figure 2 and a bubble diffuser 24 in Figure 3). Thus, Purdy et al. discloses a single open-ended tube that encloses membrane modules and aeration openings and might have an upper wall. Purdy et al. does not teach an assembly of open-ended tubes within the confines of an aeration hood.

7. Miyashita et al. discloses multiple open-ended channels (similar to applicant's open-ended tubes) within the confines of an aeration hood. In Figures 1 through 12, Miyashita et al. discloses "a membrane separator assembly for separating solids from water," which includes wall structures 106 (applicant's aeration hood). Within the aeration hood is the membrane module unit 102 made up of multiple membrane modules 103. A gas diffuser 104 is located such that openings 104a release air that bubbles up through channels between membranes to clean the membranes. Miyashita et al., Column 4, lines 40-43.

8. To recap, Purdy et al. discloses the claimed invention except for duplicating the open-ended tube and placing the plurality within aeration hood sidewalls, as taught by

Miyashita et al. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have duplicated, in the Purdy et al. filtration arrangement, the open-ended tubes since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. Also, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have enclosed the multiple Purdy et al. open-ended tubes within aeration hood sidewalls, as taught by Miyashita et al., since Miyashita et al. states at Column 2, lines 18-22, that such a modification would serve to "guide the gas diffused by the gas diffuser to the surfaces of the separating membranes."

9. To summarize, Purdy et al., in view of Miyashita et al., discloses or suggests all claim 10 limitations.

10. The invention of claims 20-21 is analogous to that of claim 10. Therefore, Purdy et al., in view of Miyashita et al., also discloses or suggests all limitations recited in claims 20-21.

11. Dependent claims 11-19 recite further limitations on the filtration arrangement which Purdy et al., in view of Miyashita et al., discloses or suggests.

12. In Figures 1-3, Purdy et al. teaches an aeration header below the open-ended tube and, therefore, below the aeration hood (claim 16) in the form of an air inlet 8 and an air diffuser 4 shown in Figure 1, an air inlet 15 with bubbles emanating shown in Figure 2, and a bubble diffuser 24 shown in Figure 3. In Figures 1-3, Purdy et al. also discloses membrane modules mounted within open-ended tubes (claim 13) and

aeration openings at the lower end of open-ended tubes (claims 12 and 18). In Figure 3, Purdy et al. discloses an air opening through the side of the open-end tube (claim 14) where the air inlet feeds into the bubble diffuser.

13. Miyashita et al. discloses that aeration openings (passages 207) through a sidewall need not be circular as shown in Figure 35. They could also be slot shaped (claim 15) as shown in Figure 38 or any number of shapes as shown in Figures 31-39. The aeration openings may also be regularly or irregularly distributed. Miyashita et al., Column 10, lines 56-58. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have made aeration openings round, slot-shaped (claim 15), or open-ended slots (claim 19) because of the equivalence of the three shapes for their use in making a hole through a structure such as the Purdy et al. open-ended tube and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

14. In Figure 5, Miyashita et al. discloses aeration hood side walls 106 that extend below the membranes 102 and, thus, below the open-ended tubes (Claim 17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have extended the aeration hood side wall below the Purdy et al. open-ended tubes, as taught by Miyashita et al., since Miyashita et al. states at Column 7, lines 7-12, that such a modification would "promote efficient scrubbing of the separating membranes."

15. Claim 11 recites that the aeration hood shares a feed tank wall and that the aeration's upper wall is sealed to its side walls. In Figure 1, Miyashita et al.

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schematically locates the hood in the center of the feed tank instead of at the side. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have located the aeration hood from the center to the side where it shared a wall with the feed tank, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70. Miyashita et al. also teaches the aeration hood's upper wall can be sealed to its sidewalls (wall structures 106a and 106b) through a plate (applicant's upper wall) so long as spaces (applicant's openings) are provided in the plate so that the subassembly does not prevent liquid from flowing vertically past the entire filter surface. Miyashita et al., Column 4, line 67 to Column 5, line 4. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have sealed the aeration hood's upper plate to its sidewalls as taught by Miyashita et al., since Miyashita et al. states at Column 4, line 59 to Column 5, line 4 that such a modification would serve to connect the sidewalls.

16. To summarize, Purdy et al., in view of Miyashita et al., discloses or suggests all limitations recited in apparatus claims 11-19.

17. Claims 27-34 recite a water treatment system similar to the filtration arrangement recited in claims 10-19 and are also rejected over Purdy et al., in view of Miyashita et al.

18. Independent claim 27 recites an aeration hood with an upper wall and there are open-ended tubes secured to the upper wall. The upper wall has openings to let water to be treated into the open-ended tubes. There is a membrane module within the tube. Purdy et al., in Figure 3, discloses the open-ended tube is secured to an upper wall and

membranes within the open-ended tube. As was shown above in the claim 11 patentability analysis above, Miyashita et al. discloses the aeration hood's upper wall can be sealed to its sidewalls (wall structures 106a and 106b) through a plate (applicant's upper wall) so long as spaces (applicant's openings) are provided in the plate so that the subassembly does not prevent liquid from flowing vertically past the entire filter surface. Miyashita et al., Column 4, line 67 to Column 5, line 4. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have secured the aeration hood's upper plate to its sidewalls as taught by Miyashita et al., since Miyashita et al. states at Column 4, line 59 to Column 5, line 4 that such a modification would serve to connect the sidewalls. In summary, Purdy et al., in view of Miyashita et al., discloses or suggests all claim 27 limitations.

19. Dependent claims 28-34 recite various limitations on the water treatment system. In Figures 1-3, Purdy et al. discloses an aeration header below the open-ended tube and, therefore, below the aeration hood (claim 28) in the form of an air inlet 8 and an air diffuser 4 shown in Figure 1, an air inlet 15 with bubbles emanating shown in Figure 2, and a bubble diffuser 24 shown in Figure 3. In Figure 3, Purdy et al. discloses an air opening through the side of the open-end tube (claim 29) where the air inlet feeds into the bubble diffuser. Finally, in Figures 1-3, Purdy et al. discloses feed tanks open to the atmosphere and, thus, the feed tanks contain both

20. With regards to claim 30, Miyashita et al. discloses openings (passages 207) in the sidewalls (wall structure 206b) of the aeration hood and the "passages 207 are constructed and arranged to pass object liquid from the interior of the membrane

module unit 202 to the exterior of the unit 202 or in the opposite direction, i.e., from the exterior to the interior of the membrane module unit 202." Miyashita et al., Column 20, lines 25-29. Claim 30 recites such openings on the open-ended tubes to pass liquid from the exterior to the interior of the enclosed membranes. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have included openings in the open-ended tubes as taught by Miyashita et al., since Miyashita et al. states at Column 20, lines 25-29 that such a modification would "pass . . . liquid from the interior of the membrane module unit . . . to the exterior . . . or in the opposite direction."

21. With regards to claims 31-34, Purdy et al. discloses an open tank in Figures 1-3. The open tank allows the water treatment system, and thus the aeration hood, to contain both air and liquid as recited in claim 31-33. Purdy et al. further teaches aeration openings below liquid level (claim 34) in the form of an air inlet 8 and an air diffuser 4 shown in Figure 1, an air inlet 15 with bubbles emanating shown in Figure 2, and a bubble diffuser 24 shown in Figure 3.

22. To summarize, Purdy et al., in view of Miyashita et al., discloses or suggests all limitations recited in apparatus claims 27-34.

23. Claims 22-24 recite a method for cleaning a membrane module in a feed tank which Purdy et al., in view of Miyashita et al., discloses or suggests. Independent claim 22 recites the following method:

- (1) Provide an aeration hood which shrouds a membrane module. The aeration hood includes an open-ended tube that partially encloses the membrane module. The membrane module is attached to the top of the hood and there is an opening at the top of the hood.
- (2) Immerse the membrane modules and aeration hood in the feed liquid.
- (3) Remove liquid to a level below the opening by permeation (claim 25).
- (4) Aerate within the open-ended tube to clean the membrane (claim 26).

In the apparatus patentability analysis above, Purdy et al., in view of Miyashita et al., discloses or suggests the apparatus used in the methods claims. Purdy et al. further teaches that the membrane modules are immersed in the feed liquid, liquid is removed by permeation, and aeration occurs to clean the membrane. Purdy et al., Page 7, lines 11-15.

24. Dependent claims 23-24 recite an additional limitation to the claim 22 method. The liquid level must still seal the lower end of the open-ended tube (claim 23) and the seal must be maintained while aerating (claim 24). Purdy et al. discloses this on Page 6, lines 13-17.

25. To summarize, Purdy et al., in view of Miyashita et al., discloses or suggests all limitations recited in methods claims 22-26.

Response to Arguments

26. Applicant's arguments with respect to claims 10-34 have been considered but are moot in view of the new ground(s) of rejection.

27. One point might be helpful, though. Applicant argues that the aeration hood is a separate structure from the open-ended tubes and that the aeration hood did not appear in the Purdy et al. reference. In the first office action, the aeration hood was viewed as subdivided into open-ended tubes disclosed by Purdy et al. Duplicating the Purdy et al. tubes would have been routine for one of ordinary skill in the art at the time the invention was made. However, the initial prior art search was also conducted to identify references disclosing subdivided aeration hoods, whether they be subdivided into tubes or otherwise. One of these references was Miyashita et al. and this reference was made of record in the initial office action. Here, claims 10-34 were rejected under 103(a) over Purdy et al., in view of Miyashita et al.

Conclusion

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

29. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENISE R. ANDERSON whose telephone number is (571)270-3166. The examiner can normally be reached on Monday through Thursday, from 8:00 am to 6:00 pm.

31. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

32. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner,
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